

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-24. (Cancelled)

25. (Currently Amended) A hydrogen energy system for use off-board a vehicle comprising:

- (a) a hydrogen generator for generating hydrogen by water electrolysis using electrical energy received from at least one source of electric energy;
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator; and
- (c) a controller having a computer processor for receiving and processing control inputs including data concerning the availability of electrical energy for use by said hydrogen generator, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs including data concerning the availability of electrical energy for use by said hydrogen generator.

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Currently Amended) A system as claimed in claim 25 wherein said control inputs received and processed by said controller for controlling the generation of hydrogen further include data concerning said hydrogen generator.

32. (Currently Amended) A system as claimed in claim 25 wherein said control inputs received and processed by said controller for controlling the generation of hydrogen further include data concerning hydrogen demand by one or more hydrogen users.

33. (Currently Amended) A system as claimed in claim 25 wherein said control inputs received and processed by said controller for controlling the generation of hydrogen further include data concerning said hydrogen storage apparatus.

34. (Previously Presented) A system as claimed in claim 25 wherein said controller further controls the storage of hydrogen.

35. (Original) A system as claimed in claim 25 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.

36. (Cancelled)

37. (Previously Presented) A system as claimed in claim 35 wherein said hydrogen is compressed by said compressor prior to storage in said hydrogen storage apparatus

38. (Original) A system as claimed in claim 35 wherein said controller controls the generation, compression and storage of hydrogen.

39. (Original) A system as claimed in claim 25 wherein said hydrogen generator generates hydrogen at a minimum desired pressure.

40. (Previously Presented) A system as claimed in claim 25 further comprising a hydrogen delivery system for delivering hydrogen from at least one of said hydrogen generator and said hydrogen storage apparatus to a hydrogen user.

41. (Original) A system as claimed in claim 40 wherein said hydrogen user is a hydrogen conversion device for powering a vehicle.

42. (Previously Presented) A system as claimed in claim 25 further comprising a hydrogen conversion device for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.

43. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is an internal combustion engine.

44. (Original) A system as claimed in claim 42 wherein said hydrogen conversion device is a fuel cell.

45. (Previously Presented) A system as claimed in claim 25 further comprising a hydrogen conversion device for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into thermal energy.

46. (Original) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid.

47. (Currently Amended) A system as claimed in claim ~~46~~ 25 wherein electricity for said ~~electricity grid at least one source of electric energy is produced by a plurality of generated from one or more primary energy resources.~~

48. (Original) A system as claimed in claim 47 wherein said primary energy resources include renewable resources.

49. (Original) A system as claimed in claim 47 wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.

50. (Currently Amended) A system as claimed in claim 25 wherein said ~~energy availability data concerning the availability of electrical energy for use by said hydrogen generator~~ includes real time data.

51. (Cancelled)

52. (Currently Amended) A system as claimed in claim 25 wherein said ~~energy availability data concerning the availability of electrical energy for use by said hydrogen generator~~ includes stored data.

53. (Currently Amended) A system as claimed in claim 25 wherein said energy availability data concerning the availability of electrical energy for use by said hydrogen generator includes energy cost data concerning the price of electrical energy.

54. (Currently Amended) A system as claimed in claim 25 wherein said controller modulates the generation of hydrogen by said hydrogen generator based on data including said energy availability data concerning the availability of electrical energy for use by said hydrogen generator.

55. (Currently Amended) A system as claimed in claim 42 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy availability data concerning the availability of electrical energy for use by said hydrogen generator.

56. (Currently Amended) A system as claimed in claim 42 ~~55~~ wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to an electricity grid.

57. (Original) A system according to claim 25 wherein said at least one source of electric energy includes at least one non-grid source of electric energy.

58. (Currently Amended) A system as claimed in claim 57 wherein electricity for said at least one non-grid source of electric energy is ~~produced by~~ generated from at least one primary energy resource.

59. (Original) A system as claimed in claim 58 wherein said at least one primary energy resource includes renewable resources.

60. (Original) A system as claimed in claim 59 wherein said renewable resources include at least one of wind, solar, and hydro.

61. (Currently Amended) A system as claimed in claim 58 ~~57~~ wherein said primary energy resources include at least one of the following: fossil fuels, wind, solar, nuclear and hydro.

62. (Currently Amended) A system as claimed in claim 25 wherein said at least one source of electric energy includes an electricity grid and at least one non-grid source of electric energy and wherein said controller selects one of said at least one sources of electric energy based on data including said energy availability data concerning the availability of electrical energy for use by said hydrogen generator.

63. (Currently Amended) A system as claimed in claim 62 further comprising a hydrogen conversion device for converting hydrogen into electricity.

64. (Currently Amended) A system as claimed in claim 63 wherein said controller modulates the generation of electricity by said hydrogen conversion device based on data including said energy availability data concerning the availability of electrical energy for use by said hydrogen generator.

65. (Currently Amended) A system as claimed in claim 63 64 wherein at least some of said electricity generated by said hydrogen conversion device is transmitted to said electricity grid.

66. (Currently Amended) A system as claimed in claim 25 wherein said energy availability data concerning the availability of electrical energy for use by said hydrogen generator includes data pertaining to type of primary energy resources used for producing said electricity.

67. (Cancelled)

68. (Cancelled)

69. (Currently Amended) A system as claimed in claim 29 33 wherein said controller initiates operation of said hydrogen generator to generate hydrogen when the amount of hydrogen stored in said hydrogen storage apparatus falls below a predetermined amount.

70. (Previously Presented) A system as claimed in claim 25 wherein said hydrogen storage apparatus comprises at least one hydride storage chamber.

71. (Previously Presented) A system as claimed in claim 25 wherein said hydrogen storage apparatus comprises at least one container for storing pressurized hydrogen.

72. (Original) A system as claimed in claim 25 wherein said controller controls the amount of electricity received by said hydrogen generator.

73. (Original) A system as claimed in claim 25 wherein said controller controls the duration of electricity supply to said hydrogen generator.

74. (Previously Presented) A system as claimed in claim 25 wherein said controller comprises a plurality of controllers.

75. (Cancelled)

76. (Cancelled)

77. (Cancelled)

78. (Original) A system as claimed in claim 25 wherein said data is transmitted to said controller by wireless transmission.

79. (Currently Amended) A hydrogen energy system for use off-board a vehicle comprising:

- (a) a hydrogen generator for generating hydrogen by water electrolysis using electrical energy received from at least one electrical energy source;
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator;
- (c) a controller having a computer processor for receiving and processing control inputs including data concerning one or more demands for hydrogen by one or more hydrogen users, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs including data concerning one or more demands for hydrogen by one or more hydrogen users.

80. (Original) A system as claimed in claim 79 further comprising a compressor for compressing said hydrogen to a minimum desired pressure.

81. (Currently Amended) A system as claimed in claim 79 further comprising a hydrogen conversion device for receiving hydrogen from said hydrogen storage apparatus and converting said hydrogen into electricity.

82. (Currently Amended) A hydrogen energy system for use off-board a vehicle comprising:

- (a) a hydrogen generator for generating hydrogen by water electrolysis using electrical energy received from at least one source of electric energy;
- (b) a hydrogen storage apparatus for storing at least some of the hydrogen generated by said hydrogen generator; and
- (c) a controller having a computer processor for receiving and processing control inputs including data concerning the price of electrical energy available for use by said hydrogen generator, said controller being operatively connected to said hydrogen generator for controlling the generation of hydrogen based at least in part upon said control inputs including data concerning the price of electrical energy available for use by said hydrogen generator.